

Wiseman, Donald H.

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REMARKS

Claims 1-28 are pending in the present application. In the Office Action mailed November 30, 2004, the Examiner rejected claims 1, 2, 9-11, 16-18, and 20 under 35 U.S.C. §103(a) as being unpatentable by Haldeman (USP 5,461,215) in view of Ammon et al. (USP 6,117,230, hereinafter Von Ammon et al. in accordance with the Certificate of Correction related thereto). The Examiner next rejected claims 3, 5-8, 12-15, and 19 under 35 U.S.C. §103(a) as being unpatentable over Haldeman in view of Von Ammon et al. Claims 4 and 21-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Haldeman in view of Von Ammon et al.

The Examiner rejected claim 1 under 35 U.S.C. §103(a) over Haldeman in view of Von Ammon et al. stating that "the sole difference between the instant claims and the prior art is the housing means" and that "it would have been obvious to one of ordinary skill in the art to modify the Haldeman reference by the teachings of the Ammon et al. reference to include a housing in order to prevent the heater from deforming and creating impurities in the process." Office Action, November 30, 2004, p. 2. Applicant respectfully disagrees.

While Applicant does not necessarily disagree that Von Ammon et al. discloses a crystal grower, Applicant does not agree that the crystal grower disclosed in Von Ammon et al. is combinable with the heater of Haldeman in the manner done so by the Examiner or that the combination thereof renders the presently claimed apparatus obvious in light of the combination.

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. MPEP §2142. Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes each and every element of the claimed invention, but also provide "a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). That is, "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." MPEP §2143.01. "The fact that references can be combined or modified is not sufficient to establish *prima facie* obviousness." *Id.* When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the

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hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

MPEP §2143 requires that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. As is supported below, not only has the Examiner failed to establish each of these criteria, but the references themselves do not support the Examiner's conclusions. Applicant believes that a *prima facie* case of obviousness has not been made, and cannot be made, based on the art of record because, as will be shown below, (1) there is no motivation to combine the references in the way done so by the Examiner, other than Applicant's own teaching; (2) the suggested combination does not have a reasonable expectation of success, at least to what is presently claimed; and (3) all the elements of the present claims are not present in the references. The Examiner has not established the three basic criteria required under MPEP §2143. Applicant will address each of these three criteria required by MPEP §2143.

The Examiner rejected claims 1, 2, 9-11, 16-18, and 20 under §103(a) stating that "[i]t would have been obvious to one of ordinary skill in the art to modify the Haldeman reference by the teachings of the Ammon et al. (sic) reference to include a housing in order to prevent the heater from deforming and creating impurities in the process." Haldeman states that "[a] cable 10 is inserted in the tube 1 in a straight or slightly curved condition ...[and that] [b]oth ends are then attached and ...wound on a forming arbor shown in FIG. 10." Col. 4, lns. 61-66. Haldeman further states that "[t]his provides a nominal turn radius which can be deformed elastically to provide a long stretched out solenoid or a short multi-turn coil." Col. 4, ln. 66 to col. 5, ln. 2. Haldeman further states that "[t]he present invention represents an improvement [...] [over an encapsulated coil construction in that] the resulting coil is flexible enough to permit its use for different induction heating applications by merely re-orienting the turns without completely reconstructing the coil...." Col. 3, lns. 57-63. That is, Haldeman teaches that it is beneficial to construct the induction heater without a housing so that the heater is deformable. The Examiner's combination of the housing of Von Ammon et al. with the coil of Haldeman disregards this teaching. Haldeman not only does not disclose positioning a housing about the induction heater, as suggested by the Examiner, but teaches that such a housing – i.e. one that would prevent the induction heater from being deformable – is undesirable. Therefore, Haldeman teaches away

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from the present invention and cannot be combined to render the present invention obvious. *MPEP §2143 et seq.*

Von Ammon et al. also fails to suggest or motivate the construction suggested by the Examiner. Von Ammon et al. teaches a process for producing a silicon crystal which "utilizes a heater ... arranged below the crucible." See Von Ammon et al. Abstract. As shown in Fig. 5, Von Ammon et al. teaches a heater (4) having turns wound concentrically in a generally common plane and positioned in a cavity (20) beneath a crucible (1). Applicant does not necessarily disagree that Von Ammon et al. discloses a heater positioned about a side wall of the crucible. Von Ammon et al. states that "a conventional heater can be arranged around the crucible" and that "it is also possible for a heater according to the invention, referred to hereafter as a bottom heater, to be used for this resistive heating." Col. 2, lns. 20-23. Von Ammon et al. teaches a heater having at least the two following distinctions from the assembly of the present claims. First, the present heater is not a conventional heater and second, the present heater is not a resistive heater, but is an induction heater.

The Examiner stated that "it would have been obvious to one of ordinary skill in the art to modify the Haldeman reference by the teachings of the Ammon et al. (sic) reference..." Applicant respectfully disagrees. A person of ordinary skill in the art, combining the teachings of Von Ammon et al. and Haldeman, absent the hindsight of Applicant's disclosure, would not reach the Examiner's conclusion. A person of ordinary skill in the art, combining the teachings of Von Ammon et al. and Haldeman, would be motivated to replace the bottom heater of Von Ammon et al. with the heater disclosed in Haldeman. Such a combination would result in the heater of Haldeman being disposed in the tube (19) – which the Examiner characterizes as a housing – of the crystal grower of Von Ammon et al. which Haldeman, as cited above, expressly states is an undesirable addition to the heater disclosed therein. Additionally, referring to Fig. 2, Von Ammon et al. discloses a plurality of support or bridging elements (10) which engage turns (6) of the heater (4) (shown in Fig. 1). As shown in Fig. 2, the support elements penetrate the turns of the heater to hold it in a coiled configuration. Combining the support elements of Von Ammon et al. would result in penetration of the tube (1) of the heater of Haldeman. Penetrating the tube of the heater of Haldeman with multiple supports would result in leakage of the coolant circulated therein and/or damage to the strands of the Litz cable of the heater. Either of these conditions would result in the combination being unsuitable or unusable. Either inadequate cooling or damage to the Litz coil would render the heater inoperable.

Accordingly, at least for the reasons set forth above, the references not only do not contain a suggestion or motivation to combine the references in the manner done so by the

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Examiner but also lack a reasonable expectation of success. As argued above, replacing the bottom heater of Von Ammon et al. with the heater of Haldeman is contrary to the express teachings of the references and renders a construction that would result in the inoperability of the heater thereof. Accordingly, the Examiner's conclusions fail to support the first and the second requirements for establishing a prima facie obviousness rejection.

In order to support a prima facie obviousness rejection, the prior art references must also teach or suggest all of the claim limitations. See MPEP §2143. The Examiner rejected claim 1 under 35 U.S.C. §103(a) as being unpatentable over Haldeman in view of Von Ammon et al. stating that a "...difference between the instant claims and the prior art is the housing means" and that "the Ammon et al. reference teaches a czochralski apparatus where there is a housing the [sic] surrounds the heating coils, note, figs." While Applicant does not necessarily disagree that Von Ammon et al. (sic) discloses a structure positioned about the base heater disclosed therein, Applicant does not agree that each and every element of that which is called for in claim 1 is taught or suggested in the art of record.

Claim 1 calls for, in part, a crystal growing apparatus having a housing positioned about a Litz coil induction heater and constructed to receive a receptacle for containing a crystal growing material therein. As shown in Fig. 5 of Von Ammon et al., a tube 19 is positioned about base heater 4. Applicant does not disagree that the tube of Von Ammon et al. encloses a cavity about heater 4 however, that is not all that is called for in claim 1. Claim 1 calls for the housing to be positioned about the heater and constructed to receive a receptacle for containing a crystal growing material therein. As shown in Fig. 5 of Von Ammon et al., the crystal growing receptacle shown therein (1,2) is clearly not received in tube (19). Additionally, Von Ammon et al. further states that the "coiled heater [is] arranged under the crucible." Col. 1, lns. 60-61. Because of the position and planar construction of the heater of Von Ammon et al., the heater cannot have a housing that is both positioned about the coil and constructed to receive the receptacle therein as called for in claim 1. Additionally, as previously argued, Haldeman discloses that the heater thereof is axially deformable. Positioning any housing about the heater thereof would fix the relative position of the turns of the heater. Haldeman expressly teaches away from a heater with a housing positioned about the turns thereof. As such, each and every element of claim 1 is not taught or suggested in the art of record as required under MPEP §2143. At least for the reasons set forth above, Applicant believes claim 1, and those claims that depend therefrom, are patentably distinct over the art of record.

The Examiner also rejected claim 9 under 35 U.S.C. §103(a) as being unpatentable over Haldeman in view of Von Ammon et al.. In addition to the lack of motivation to combine the

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references and the lack of a reasonable likelihood of success in combining the references, the combination of references also fails to teach or suggest each and every element called for in the claim. In rejecting claim 9 the Examiner failed to address any portion of the last element of the claim. Claim 9 calls for, in part, at least one support leg extending along a coiled portion of the casing and constructed to retain the casing in a coiled position.

As previously argued, Haldeman discloses that an aspect of the heater disclosed therein is that the "resulting coil is flexible enough to permit its use for different induction heating applications by merely re-orienting the turns without completely re-constructing the coil ...." Col. 3, lns. 60-64. Adding a support leg to the heater of Haldeman is not only not suggested nor disclosed in Haldeman, such a construction is expressly discouraged. That is, adding a support leg to the heater of Haldeman would prevent the re-orientation of the turns of the coil thereby requiring complete reconstructing of the coil. Additionally, were the support element (10) of Von Ammon et al. to be combined with the heater of Haldeman -- in express contradiction to the teaching therein -- the support elements of Von Ammon et al. do not extend along the coiled portion of the casing as called for in claim 9. As shown in Fig. 2 of Von Ammon et al., the supports disclosed therein extend from the coil generally perpendicular thereto. Additionally, the support legs do not engage a casing of the coil but are directly engaged with the heating element thereof. Referring to Fig. 2, Von Ammon et al. states that "[e]lement 10 is connected to a turn 6 and protrudes from the turn 6 in the manner of a foot." Col. 3, lns. 57-59. As shown in Fig. 2, element 10 is threadingly engaged by turn 6 of the heater and secured to a base by a socket 11. That is, element 10 directly engages the heater and supports the heater by extending in a direction generally transverse to the coils of the heater. Accordingly, the bridge element 10 of Von Ammon et al. does not extend along the coiled portion of the heater as called for in claim 9 but merely extends from the heater. As such, each and every element of that which is called for in claim 9 is not taught, shown, or suggested in the art of record as is required under MPEP §2143. Accordingly, for all the reasons set forth above, Applicant believes claim 9, and those claims that depend therefrom, are patentably distinct over the art of record.

The Examiner rejected claim 17 under §103(a) under the same analysis as claims 1 and 9 over Haldeman in view of Von Ammon et al. As previously argued, the Examiner has failed to establish the motivation to combine to the references and the likelihood of success from the combination of references to support a §103(a) rejection. Furthermore, similar to claims 1 and 9, the art of record does not teach or suggest each and every element of claim 17 as required under MPEP §2143 to support a prima facie obviousness rejection.

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Claim 17 calls for, in part, coiling a Litz coil to receive a reservoir within a coiled portion of the Litz coil and attaching at least one leg to the coiled portion of the Litz coil to maintain a coiled orientation of the coiled portion of the Litz coil. As argued extensively herein, Haldeman expressly teaches away from securing the coil to any type of housing or with any type of legs. Haldeman states that the coil disclosed therein is to be flexible or adjustable to allow its use with different induction heating applications by merely re-orienting the turns of the coil. Furthermore, the heater disclosed in Von Ammon et al. is disclosed as preferably positioned beneath the reservoir disclosed therein. Von Ammon et al. states that "[t]he present invention [also] relates to a heater for heating a silicon filled crucible comprising means for placing a heater below a silicon filled crucible...." Col. 1, lns. 62-64 (emphasis added). That is, the reservoir of Von Ammon et al. is positioned above the generally planar coiling of the heater disclosed therein. As such, the heater of Von Ammon et al. is not coiled to receive the reservoir within a coiled portion of the coil as called for in claim 17. Therefore, the combination of references not only lack the motivation or likelihood of success to combine the references in the manner done by the Examiner, but also does not teach or suggest each and every element called for in the claims. For all these reasons, Applicant believes claim 17, and those claims that depend therefrom, are patentably distinct over the art of record.

The Examiner next rejected claim 21 under 35 U.S.C. §103(a) as being unpatentable over Haldeman in view of Von Ammon et al. stating that "[t]he Haldeman and Ammon (sic) references are relied on for the same reasons as stated, supra, and differ from the instant claims in the method of growth." Applicant agrees with the Examiner that the instant claims differ from the art of record. The Examiner further states that "... in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art" to combine the Haldeman with Von Ammon et al. references. Applicant respectfully disagrees.

In order to support a prima facie case of obviousness, it is the Examiner's duty to show that (1) there is some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, (2) that there is a reasonable expectation of success, and (3) that the prior art references teach or suggest all the claim limitations. See MPEP §2143. As previously argued, the references lack the motivation to combine the references in the manner done so by the Examiner and lack a reasonable likelihood of success in combining the references, at least one that renders the present claims obvious. Additionally, as the Examiner stated, "the ... references ...differ from the instant claims in the method of growth." Claim 21 calls for method of growing a crystal comprising the steps of, in part, energizing a coil of wire that has Litz characteristics and

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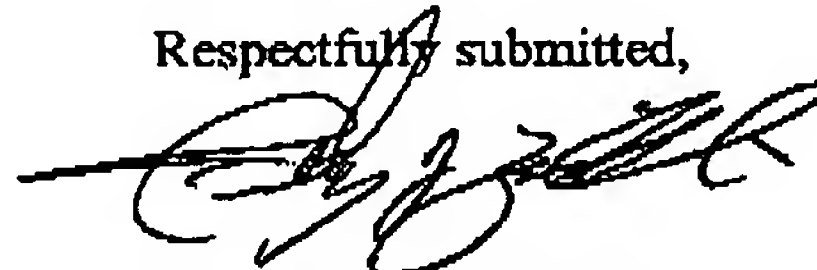
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that is wound about a vessel and held in a coiled position by a housing formed thereabout. As discussed in detail herein, there is no teaching or suggestion in the art of record for such a method of growing a crystal. Moreover, the Examiner's statement clearly evidences as much. That is, by the Examiner's own admission, "the art of record differs from the instant claims in the method of growth." Accordingly, the art of record does not include each and every limitation recited in the claims. As such, Applicant believes claim 21, and those claims that depend therefrom, are patentably distinct over the art of record.

At least for the reasons set forth above, Applicant believes claims 1-28 are patentably distinct over the art of record. Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-28.

Applicant appreciates the Examiner's consideration of these Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,



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